Learning by Building: Engineering for Preschool Children
Teacher Time

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Kristin Ainslie: Hello, everyone. Welcome to Teacher Time today, on February 13th. We are your hosts. I'm Kristin Ainslie.

Dawn Williams: Hi, I'm Dawn Williams.

Kristin: We are both curriculum specialists here at National Center for Quality Teaching and Learning. And we have both been classroom teachers, so we are excited to do Teacher Time every month.

Dawn: That's right. So just a few logistics before we get started. We would like for you all to sign in and let us know that you're here. This is how we keep track of your attendance. While you are doing that, you can also opt in to join our Teacher Time community and receive email communications from us like announcements and day-of reminders. And that's also how you'll get the follow-up document afterwards, where we include a summary of the presentation and some resources.

Kristin: That's right, and we really want to know what you think. Sometimes we get emails, and we really try to incorporate the information that you -- because this is for you, for teachers. We want to know what you think of the show, we want to know what you want us to talk more about. And so we have an evaluation. It'll open up later in the show. The evaluation is how you get your certificate. So you can watch -- by watching live today, you're able to get a certificate of attendance. And so we really want you also to just check your name. When you email your email and name, make sure it's exactly as you want it on your certificate.

Dawn: And we also want to remind you that our focus for this year is on science, technology, engineering, art and math. It's STEAM in the preschool classroom. We've had a whole series of this, starting in September, and those recordings are up on the ECLKC of previous months.

Kristin: That's right. We're today going to focus on the E in STEAM, okay? Engineering, the design process for preschoolers.

Dawn: That is right. So first we're going to talk about what engineering currently looks like in the preschool classroom. We've got a video of Dr. Daryl Greenfield discussing that for a bit. Then we'll also introduce you to the engineering design process. It's similar to the writing process, but it's specific to engineering and creating and the connection of that -- the connection between the design engineering process and social-emotional learning. And we'll also show you the developmental progression of block building.

Kristin: Right, that's -- I love that. Okay, then we're going to have our Try It Out! section, which is where we're going to give you lots of engineering activities today that you can replicate in your classroom, you can do on Monday morning. You'll also get a really fun and easy way to introduce children to the world of computer programming, computer engineering with a hands-on coding activity. I can't wait for that.

Dawn: It's going to happen. And then we'll also introduce you to some resources.

Kristin: That's right. We're going to have lots of resources you can do. Gail Joseph will be here with us to give us a Behavior Management Minute. She's also going to talk about some Resiliency & Wellness for you all out there in this field doing this every single day. And then we'll close and talk about what we're going to do next month.

Dawn: All right, so like we like to do, we want to start you out with a chat question before we get into the presentation. So here's a question: what are your favorite building materials to use in your classroom? What are the children into? What do the children in your class like to build with? Chat your answers, and we'll be back in a minute.

Kristin: Okay.

[music plays]

Kristin: All right, thanks, everyone. We're back now, and that was a great chat question. Somebody talked about building with PVC pipes, which I love. I love that idea. Keep chatting in those answers, because you can continue to do that as we talk about it. But think about all the different building materials that you can use in classrooms. I just -- I love that.

Dawn: Yeah, and please do continue to chat throughout the show. We've had people really appreciate what they hear from other folks that are in the same positions, so please share your ideas, because there's lots of strategies shared that way, too.

Kristin: Just because we're done with our chat here doesn't mean you can't continue to chat for the whole time. That's great. Okay, so what does engineering typically look like in a preschool classroom? Well, here are two girls in this photo here. This is what we might think about when we think about engineering. Block building, right? They are in the block area, they have some structures that they're building. You can also see that they have some imaginary toys that they're using, some horses, some animals that they're putting in with this block area, in this block center.

Dawn: Yeah, so here's another example. Here's a group of children working together. It looks like they're working on the same structure. So they're probably working together to figure out what they want to build, what's going to go where, doing some planning together and some peer interaction around this particular structure.

Kristin: That's right. So here's another couple pictures. This little girl here on the left here, thinking about in your classroom having the blocks reflect the developmental level of the children in your classroom, right? This girl looks like maybe she could be 4 or 5. She's using heavy, heavy blocks. She's using her arm muscles to lift those blocks up. Obviously it's not something you're going to use with toddlers or younger children, but as the children get older and stronger, these would be great for just spreading out your block area a little bit more.

Dawn: And here we have some blocks that they're building outside. You can imagine what imaginary play might be going on here. It looks like that's a structure that was built with those different types of

blocks that interlock together, and it's a hiding place or a hole or a tent that they can go hide into, so block building also facilitates a bit of that as well.

Kristin: That's right, that imaginary play.

Dawn: Yeah. So, and here's another example of that, of what engineering might typically look like in the classroom. Here we've got a group of students who are working together, but they're also using a character. And in this situation, they were using the structure they were building to facilitate their imaginary play. So here this little guy is saying, "Hey, I need to get my little character down the stairs." And so they built some stairs to go along with it. So in a lot of ways, we see that happening in preschool classrooms, too, where children are using the structures to help facilitate their play or building castles or building structures that fit what they're playing with.

Kristin: That's right, so it's almost like they have a mini-problem. Their little character's on top, "How do I get down?" right? So that's the problem. "I'm going to build stairs, and we're going to make him -- help him climb down." Or, "I'm going to build a bridge," and they're going to be able to get over the bridge. So these little mini-problems, we're going to talk about in just a moment how to set those up for children so that they can begin the design process.

Dawn: Okay, so next we want a video -- we have a video we want to show you. This is what we mentioned, Dr. Daryl Greenfield. He's talking a little bit about what engineering looks like in the preschool classroom and does a nice job summarizing what that can be.

Kristin: That's right.

Dr. Daryl B. Greenfield: Part of the engineering design cycle is making things fail. So -- and when you build something, if you give, you know, 10 children the task of building a house or a bridge or whatever, there's not one and only one way to do it. So what the teachers end up seeing as they watch the children explore is there are multiple ways to attack a particular problem. There's not one and only one solution. And making mistakes and not getting the, quote, "right answer" the first time is actually very useful, because part of the engineering design process is you build something and then you test it to see, you know, under what conditions does it fail.

Teacher: Oh, we can help.

Daryl: And then that is very useful information to be able to build it another time and try to deal with the issues that fail. So if you actually take young children and put them in the block area, and often what happens, unfortunately, is teachers, preschool teachers use the block area as sort of, "Here's a place where two or three boys and maybe a girl on occasion are interested in playing with trucks or building things, and they can just go do their thing, and I don't really need to pay attention to that." But when you look at the literature on spatial relations and on block building, you can see that that's actually, with some scaffolding from the teachers, a major opportunity to improve thinking ability in young children. And what you see when you put children in the block area, they happily build something, it falls over, they're not, you know, upset. They don't go into hysteria. They're, "Okay, well, why did it fall over?" You know, "Why is this structure not stable? How can I build it again so that it is more stable?" And teachers can help the young children, you know, to understand this.

So one of the things we're beginning to see in this project that we started in Boston, this project is called RISE. It's Readiness through Integration of Science and Engineering. One of the things that we're seeing is that, as the teachers watch the children be comfortable and see how the children are thinking and problem solving and building structures and they fall over and they build them, you know, to be more stable, that this is not frightening. They don't need to know the, quote, "the answer." There is no one and only one right answer. And it's okay to make mistakes and fail. You learn from -- in engineering, it's actually a part of the design process to learn, you know, from things that don't initially work the way that you think they're going to work.

Kristin: All right, we're back after that video. I love that video.

Dawn: Me, too.

Kristin: And I love how he talks about that it's okay to fail, that that is part of the process, the learning experiences that happen when something falls down or the blocks, you know, crumble to the ground. What a great idea. I was thinking about having teachers model this kind of problem or this kind of thing that happens all the time, modeling it at circle: building something, letting it fall down, and modeling how we can think about, "What happened? How come it fell? Oh, well, that's -- you know, I'm just going to build it again, I'm going to try again. Maybe I make the base bigger," that kind of thing.

Dawn: Right.

Kristin: I love that.

Dawn: So now that we have a better idea of what engineering looks like in the classroom, we want to talk about the design engineering process. So the design engineering process is really similar to the writing process or maybe the scientific method. There are certain steps that you follow to get to your final product. So you think of what you want to write about, you brainstorm about it, you write it, edit it, and then you've got your final project. The design engineering process is something that's similar to that, and what it tries to do, what -- it is part of this creative process that a lot of different types of engineers might do. So computer engineers, electrical engineers, there's something about that design engineering process that they follow, because it helps them create and build something and fix that model along the way.

Kristin: Okay, excellent. So here is a slide that shows you sort of the process that children will go through, and we're going to give you this form. You can post it in your class if you would like to. First of all, we talked about a problem. So this isn't a problem that -- you know, a social problem we talk about a lot, but this is different. This is like a problem -- let's say that we want to move materials from dramatic play over to the block area. This is a classroom problem. How are we going to do this, right? And so the next step...

Dawn: Yeah, and then the next step is brainstorming solutions to solve that problem. So, you know, when you're identifying that problem, it might also just be something that you want to make better. Maybe something that just needs a little bit of an improvement. So now, then you brainstorm solutions. How are we going to figure out how we move these books over here to the block area so we can use them? So maybe we could use a blanket to carry things over, maybe we could try to get some type of wagon in the classroom.

Kristin: Wagon, okay, okay.

Dawn: Maybe we can try to build a box. Like, there's a lot of different things we can try to do, and when you're doing this in the classroom, you could maybe do this in the large group, having children generate a lot of different ideas for how they might brainstorm the solution. Or it's in small group or individually, but it's a way to -- you facilitate that process as the teacher by asking some different questions and letting them be as creative as they want to be in trying to figure out the solutions.

Kristin: I love it. So all ideas are brought together, okay? So then we build a model. So this is where we're just going to pick one thing. Doesn't have to be the right thing, it doesn't have to be, you know, the best thing, but we're going to pick one thing and give it a try.

Dawn: That's right. And so, here again, you might have to provide some of these materials. I experience this in my house all the time. It's, "Let's build a fort!" "Well, let's get these chairs down, let's get that blanket from over there. We need that pillow from there." And so as that teacher, you might have to facilitate some of this, what kind of materials the children might be looking for. So in the case, if we're going to try to build a box to go from -- to take the materials from one place to another, maybe you can go raid your recycling area, get different pieces of cardboard or different materials out of there and help give some of the children the things that they'll need to build their model.

Kristin: That's right. Okay, so then we try it out. And then the bottom falls out, let's say, right? So something happens. The children put in the materials, we're pushing it over to the block area, bottom falls out. So we have to refine the model. That's part of the process. That's the really fun way for children to understand, "Oh, this is okay! The bottom fell out. We need to make a stronger bottom to the box. How can we do that?" right? And again, thinking about the -- you know, just seeing the little children's scientific thinking take place during this process.

Dawn: Mm-hmm. And so then, when they've got their final product, you share about it. Children could maybe take pictures of the different stages of their development and put them outside on the wall and share their final project that way. It could be in a letter that goes home to parents or an email, pictures sent that way. Maybe one child or a couple of students get up in front of the classroom at circle and talk about how they just figured out their problem, the different ways they wanted to solve it, how they built their model. Well, since they are the ones that went through this process, they know the steps that they followed, and they're going to be able to talk through this whole entire design engineering process while explaining how they created what they did to solve their problem.

Kristin: That's right. I love this. I think this is a really great thing to use in the classroom. And again, we'll send it to you so you can use it. All right, so really this is an instructional move, I mean, that we think about. I mean, the learning that happens during this process is enormous, right? It's a great opportunity to inspire children's natural curiosity.

Dawn: And also this design engineering process is also a way to create opportunities for problem solving. It really is a structured way to facilitate those problem-solving skills. We've been talking about that all season long. But here you've got some steps to follow to help try and support children through that process. And as we've discussed in previous shows, too, that you're addressing all types of

approaches of learning, like persistence and creativity and ways that children are just addressing -- addressing their problem. You're also doing a lot of that as well.

Kristin: Absolutely. Okay, so how can you engage children in engineering in your classroom, okay? So let's talk about the easiest way to start. Let's talk about block building, okay? So I've got some blocks here. I'm going to slide these over, and there is a process, right, that children go through which I actually didn't know much about. I have definitely observed it in my classroom with children, but I didn't know that there was really a structured kind of block-building stages that children developmentally go through.

Dawn: Yeah, and there are six stages to it. So that first one is where you might take one particular object and use it as maybe a phone or a car or as a dog. Like, that particular object is some type of imaginary thing for the child to play with. The next stage is building something vertically in a one-dimensional format. Just like Kristin is doing now. And then there's a lot of knocking that down as well.

Kristin: That's right. Super fun.

Dawn: When we're in that stage.

Kristin: Right, so these are children maybe 2 -- you know, 1, 2, 3-year-olds are beginning at this stage, depending on how experienced they are with blocks around them.

Dawn: All right, next stage.

Kristin: All right, the next stage that children go through is really about making a horizontal, flat building of connecting blocks together in a line. So oftentimes children might make a road. They might make a train track, right? And then children can just construct -- again, stages next -- around the road or the train that they built, right? So then it's becoming a little more two-dimensional, thinking a little more sophisticated. Maybe there are some road signs, maybe they begin to make a bridge across the road, but this is kind of the next stage. I mean, I've seen in classrooms where children make these long, long, long connected block roads, and that's just a stage that many, many children stay in.

Dawn: Absolutely. So then the next stage is where children might then create three-dimensional structures, where they're piling blocks on top of each other, and not necessarily with space in between, but it's becoming more three-dimensional here, and it's just piles and piles and piles and piles while they're creating some structure and really discovering what might make things stable, what different-size blocks are going to do, what different-shaped blocks are going to do to your structure. That's the next stage.

Kristin: Right. And so finally when we see children who are maybe 3, 4, 5, 6 years old, these children are building much more sophisticated things with their blocks. So they're building enclosures possibly for zoo animals, maybe it's a farm, maybe they're making a large garage for cars. This is the really fun, fun time to include lots of imaginary toys within your block area, so animals, sea animals, cars, people, lots of things that can be used for building. And right, so here we can think about that problem that we talked about. Let's say that Dawn is building her farm or her zoo, and there's an opening here, so we could -- the teacher can facilitate, "Oh, my goodness, Dawn, this is a fantastic zoo. I love it! But what happens if the animals sneak out the corner?"

Dawn: Oh, I need to close this up! I don't want them to get out.

Kristin: That's right, that's right. I love it. So this is really -- now I'm sure you're all sort of thinking about the stages of block building that the children in your class are, thinking about progressing them through those stages. All right, so why does this matter? Why does this matter? So engineering, like other areas of learning, develops over time with exploration and support. So a child who is new to block building might not come in and just begin to build an elaborate zoo for their animals, right? They're going to -- they're going to drive the block like a car, they're going to stack them up and knock them down. Children gain critical thinking skills during block play, really, really fundamental skills that help them build on more and more thinking and help them think like scientists. So we can support this in many ways.

Dawn: For sure. And so what are some other ways that you can engage children in engineering in the block area? Here are some challenges for you. You could maybe ask them how tall they can make it. How much can you build something in one minute? How much can you build something in five minutes? How tall can you make it? Is there a way that you could build a tunnel so that children could -- you can create something that things can go through? Can you build something as a team? How might you work together to do some of that stuff? How -- like, how long can you make something? Could you use that to measure some different things? So here's just some ideas that you could maybe challenge some of that current building that's going on.

Kristin: Right, and weekly challenge, right? Here's our challenge for the week. Yeah, I think that kids, especially kids who are even more sophisticated in their block building can get really into this. And think about the social -- you already talked about the social-emotional development and skills that can happen during block play. This is a really fun thing to do. All right, so another way to engage children in block play is to mix it up. Not only using the wood blocks that we love so much, but raid that recycling bin. Think about using cardboard boxes, string, lids, straws, right? There you go. And what can children build with these? They can absolutely build anything. The sky is the limit. Kids can get so creative with figuring out how to, you know, get this plate to stay on top of here, and maybe this is going to be a new holder for the markers that the teacher needs to use at circle time for the whiteboard. So, you know, give them some tape and just let them go. It's incredibly exciting.

Dawn: So now we want to show you a video of a child who's doing some building in his classroom. Listen to what the teacher is saying to the child and think about what type of structure he's making and then also what might be the building stage that that little boy is currently in. While you are looking at that, we are going to put those stages of building, the developmental stages of building blocks back up there so you can think about that a little bit. But this is a way we're trying to do a little bit of a knowledge check to apply some of the things that we've been talking about.

Kristin: Great.

Teacher: You took it apart! Huh? We don't have any apples.

[child babbling]

Teacher: You took it apart? Good. Can you put it back together? Back together? Small one.

Boy: Small one.

Teacher: Right. Big.

Boy: Big.

Teacher: Big. Small. Good, now you're stacking them. Big.

Boy: Big.

Teacher: And big. Wow, look what you did!

Woman: Good job!

Teacher: Yay! You taking it apart? You want to stack them again? Small. Small. Good, you did it! Is that easy for you?

Boy: I did it!

Teacher: That's the easy way, huh? Be careful, Lumia. Are you done with those? What are you doing? Stacking? Say stacking.

Boy: Stacking.

Teacher: Stacking.

Boy: Stacking. Stacking. Yay!

Teacher: Stacking, yay!

[boy babbling]

Teacher: You want to put it together? Snap. Snap. Snap. Say snap. Snap. That's the last one. Where do you want to snap it at, right here? Good. You took it apart!

Boy: Apart!

Teacher: You're taking it apart.

Kristin: All right, welcome back, everybody. That is the most adorable video.

Dawn: He's so cute, "I did it!"

Kristin: "I did it!" I love that little boy. If you were lucky enough to be that little boy's teacher, think about how you would plan for and help him to scaffold his development to the next block building stage. Go ahead and chat this in, and while you chat your answers, you'll see a slide that shows the block building developmental stages. And so think about how would you help him to the next level? We'll be back in a moment.

[music plays]

Kristin: All right, everybody, so just in case you weren't convinced already, one of the things we want to highlight before we show you some activities are a few statistics about the field of science and engineering and how just getting you thinking about why this is so important to focus on right now for young children.

Dawn: That's right. So we talked a little bit about this in the first show, but just to highlight specific to engineering, there are some findings out there that say that girls and boys don't significantly differ in their abilities in mathematics and science, but they do tend to differ in their interests and confidence in doing STEM activities.

Kristin: Right, so let's boost up that confidence right now, right?

Dawn: Well, and if you think about it, are girls and boys even that different in their interests in the preschool age?

Kristin: Oh, gosh, I -- absolutely not. I mean, girls and boys are both in the block area, they're both building, creating. And that confidence -- lack of confidence hasn't yet happened, right? So boost it up. Okay, so another one is that male students are over three times more likely to be interested in STEM majors and careers as they're older compared to female students, right? So another reason why we want to help young girls feel really confident about this area of learning.

Dawn: And this one as well. Women of color comprise less than 1 in 10 people employed in science and engineering fields.

Kristin: Yeah, that's tiny.

Dawn: And think about about all those little girls that are in your classroom. They're excited, they're interested. So even more reason to start introducing some of these things now.

Kristin: Absolutely. For children with disabilities, for children with special needs, language delays, children who have, you know, learning delays in your classroom, the hands-on, go at your own pace, exploratory nature of science and engineering activities makes them so accessible for all children. This is why these kinds of activities are so fun and important to do, right? Girls and boys both love exploring the world around them and experimenting with materials. And then the blending that engineering activities can do with technology, art, math, problem solving really appeal to many, many children's interests.

Dawn: Absolutely. All right, so we are going to take a quick break and come back with our Try It Out! segment.

[music plays]

Kristin: Welcome back. We are now in our Try it Out! segment. We're going to give you lots of activities for you to do on Monday morning in your classroom. Of course today we're highlighting engineering activities that can be done in the preschool classroom that are different from block building, too.

Dawn: That's right. So there are lots of different types of engineering. There's civil engineering, where they're looking at construction and planning our roads and bridges. There's chemical engineering, where they're using chemicals to create new things, such as the things that are in your shampoo or immunizations, for example, or even some ingredients in your food. There are mechanical engineers, electrical engineers, and also computer engineers. And in our preschool classrooms, we tend to think a lot of building, but there are lots of other types of engineering that we can also help prepare children for, and so we're going to try to provide some activities for that.

Kristin: That's going to be exciting. So it seems important that we just heard about that women and people of color are less likely to be engineers, involved in the engineer field, right, as we -- as they grow older. So also in a previous show we highlighted how children living in poverty are much less likely to go into STEM fields as they grow older, right? So this is the time to just get these foundational skills, these fun, fun things really that children are so interested in, help children become -- thinking as scientists. And this is it. This is -- of course, if you're not already motivated, this is why.

Dawn: Here's some more reasons. All right, so we have got an activity for you to introduce computer programming concepts to children.

Kristin: So... this is amazing, Dawn.

Dawn: Okay.

Kristin: Computer coding. Okay, so how are we -- how are teachers and us going to help children learn to code when -- I have zero experience in coding, right?

Dawn: Right, and I think that's true for a lot of people. Coding is something that you grew up -- people who are adults now haven't necessarily grown up learning coding in school, certainly not in high school unless you're someone that went into computer engineering. So I think there's lots of folks out there that haven't seen a coding environment. And so before we introduce the activity you could do, we also wanted to just give you the background information about what a coding environment looks like so you'll know what you're actually setting up children for.

Kristin: Okay, because I hear "coding," and I all of a sudden I start getting a little bit nervous.

Dawn: Yeah, like what -- what are you talking about?

Kristin: But you're going to show us it's so easy, right?

Dawn: We're going to show you it's so easy and show you something that first-year Computer Science 101 folks do. Okay, so computer engineers really are programmers. And they are learning how to give computers commands to tell them what to do. Really simply, summed up in a sentence, that's what it is. So we're going to go ahead and show you a coding environment. This is code.org you're seeing right here. This is a free website where anybody can come on and do some activities and learn how to code. So here you'll see there are three basic commands that you see in a coding environment. This one is called blockly. And this is something that's used in like the first-year computer science programs. This program right here is something that they first start learning with, and we can introduce it to you here for free.

Kristin: Excellent.

Dawn: And so there's three basic commands. There are some other ones there, but we're going to focus on how you move forward, turn right, and turn left. Now, you'll notice that you can indicate the number of pixels or the number of degrees that you might turn, and we'll get into that in our activity a little bit. But all you do is tell the computer what you want it to do when it runs. So that programmer -- as a programmer, I'm deciding what I want this character to do. So I want her to move forward, and then I want her to turn right. And I think I'll have her move forward again. And I'll have her turn left, and then I'll just have her move forward. And so then, to get her to do what I want her to do, I click "run," and she does it.

Kristin: Moving forward.

Dawn: There you go. Turning right, and forward again. Turning left.

Kristin: And moving forward.

Dawn: And moving forward. That really is the basic coding environment. So our activity we're going to show you is going to be based on that. And really it's about putting that child in the position where they're the computer programmer making the decisions on solving the problem or where they want the person that they're working with to go.

Kristin: I'm still with you. I think this is fun. I can do it! I mean, we dragged those things over, it tells it where to go, and now we're going to do it with the kids, right?

Dawn: We're going to do it with the kids.

Kristin: Okay, I love it.

Dawn: All right, so here's an example. Let's say you're out on the playground, and you've got the child who's a computer programmer, and he is going -- he's working with another partner or maybe you could do this with a volunteer in the classroom or maybe this is something that could be done with a parent out on the playground, but they want to get the person that they're working with from point A to point B. So really similar to what we were doing in the actual computer program. That child who's the programmer is giving commands and making decisions on what to do. So let's say we're going to have them move forward, and that looks like it might take about 8 steps for them to go where they want them to go. So they tell them to move forward 8 steps. So then they get to the part where they're going to turn, and instead of -- there might be some kids out here that might not know their left from their right. That doesn't matter. Maybe you just give them some arrows that tell the person that they're working with where to turn. And so here the child could say, "Why don't you turn in a half circle?" Or if you wanted to introduce degrees, you could say, "Turn 90 degrees, turn 180 degrees," so you're introducing that to them. And it looks like maybe they need to take about 6 more steps, so you have them move forward and take about 6 more steps, and then they would be at point B.

Kristin: Oh, my gosh. How fun.

Dawn: And that's pretty much the basics of it. And what I like about this is that there are a lot of different extensions that you could do with it.

Kristin: Right, exact-- I mean, I'm thinking about games and mazes and kids using their stuffed animals and one child being the programmer. I love that.

Dawn: And they could even plan this out before. So here we just have a blank -- a grid that's got squares on it. And this is one of our little NCQTL kids. You could use any type of character or maybe one of the little things from a game, you might use. And you pick a starting point, and the child will decide where they want this character to end up in the end. Maybe you want to put a couple road blocks in there so they have to figure out a way to get around it. And what they're doing is giving the other person or maybe their stuffed animal or their partner some commands on how to do that, just saying, "Move forward," turning in what direction they tell them to turn. And really you're introducing those basic concepts. You can even make this like a map of your outside playground area, right, and then have them do the planning ahead of time.

Kristin: So many extensions of that. I love that! I love that! That's so exciting. Okay.

Dawn: So introducing basic commands for coding.

Kristin: For computer coding, there you go. Okay, so another activity that we want to show you and talk to you about is found objects, a creation station. So think about having maybe an area of your classroom, one table, where there's just found objects. And this could be objects that you bring from home, it could be objects that children bring from home, it could be objects that are just in the recycle bin. Cardboard, tape, plastic bottle caps, craft sticks, cotton balls, Q-tips, anything, right? Put them out, let them create, and see what happens.

Dawn: Yeah, you can create your own tinkering station where you might give children lots of different materials, as Kristin just mentioned, to tinker with and to also do some of the challenges we mentioned earlier. So you could take some of those recycled materials and think about how long can you make it, how could you build something as a team. Some of those same questions we introduced to you earlier, but it's in a center in your classroom, and you're giving them some different ways to do it.

Kristin: I love that. Okay, so as you know, we did a really fun activity with our staff here. So thinking about this activity as a professional development activity, a creation station for staff before you do it with children. So we did this here at NCQTL. We had a lot of fun.

Dawn: We did.

Kristin: And we're going to show you a little video, but thinking about all of the great ways that staff can really learn about what the children are going to be thinking about, right? So it's kind of challenging to use these materials. They're not materials that you might think of in terms of being sturdy or strong, but having them together with a team is a really fun, fun thing to do for professional development.

Dawn: Right, and once you go through it yourself, you'll be better at planning that lesson for when you have the children do it, too.

Kristin: Absolutely. Great.

Dawn: All right, so let's go ahead and take a look at that video.

Kristin: Perfect.

[music plays]

Kristin: Okay, so that was very fun, and we had a lot of fun doing that. And of course we had a lot of fun having that filmed, because it was so fun to show in fast motion. We had two teams, they had materials. It was a lot of fun.

Dawn: So how did you guys select the materials? Kristin did this with the team. I got to see the video afterwards.

Kristin: Yeah, so really we literally just went around the office and pulled what we could out of recycling bins, right? We have lots of recycled paper around here, cardboards. I actually added some pipe cleaners to it, we added some tape, and they just went at it.

Dawn: And so how long did it -- it was very fast. We did it in that way so you could see the whole thing happen, but how long did people actually do that?

Kristin: You know, we set the timer for about five minutes. And we gave them a challenge and let them go.

Dawn: And then were there any problems along the way? Like how did they figure out -- because some of those materials aren't the easiest to work with.

Kristin: Right, so the challenge was for them to build something, a structure that went from the table up to the ceiling without taping it to the ceiling that was freestanding and was solid on its own. So they had five minutes to do it, and one kind of began to topple. They strengthened it back up. After it was done, one of them an hour later did topple. One of them is still standing. So, anyway, it was great fun, and it's really, I think, beneficial, too, for staff and to know what children -- what you can kind of help with those leading questions for children as they're building.

Dawn: And so, yeah, how might we modify something like that for children?

Kristin: Right, well, I mean, again, thinking about those challenges. Thinking about, you know, can you build something with string and straw and tape? Can you build something with a partner? Can you build something that stretches between the two of you? It can absolutely be anything. Very, very simple challenges to getting to be more complex challenges, you know, with the child's development.

Dawn: And really it's developing so much of their problem-solving skills and critical thinking skills and their approaches to doing this type of work through all these different activities.

Kristin: So very fun.

Dawn: All right, so we want to introduce you to one more activity and also take a look at the STEAM planning form to do this. So we thought about movement and machines. If you were ever doing something with ramps or different types of vehicles, like how fast or how far something might move or even pendulums in your classroom, that's kind of what we're thinking here. And there are a lot of different materials you could explore with this, especially if you're going to build a pendulum in your classroom. You could be building something and then also figuring out how you might get the piece that's the pendulum to move. So lots of different ways that you could create some of these things.

Kristin: That's right, and so thinking about these things in terms of stages. So when the children are first learning this kind of thing and you're introducing it, you might just start with how things move. So how do -- how is it going to be different if I drop this block and drop this ball? What's going to happen? How do tops spin? How do ramps -- you know, how does a ramp affect a car or a ball? And then going into the laws of motion. Swinging things, bouncing balls, weights and motion and how that affects all of that, right? And then thinking about maybe having a wheel day, where children bring in wheeled toys from home, you have some available in the classroom, you observe them, you compare them, you explore the wheels in different situations. Maybe you have a ramp that is just a cookie sheet, right, and then a ramp that has bubble wrap over it. What are the differences? And will this car go faster or slower? And why? So thinking about movement and machines, there's just so much that can be extended over time.

Dawn: So we wanted to pick one of these and talk through our STEAM planning form with you. This form is going to come out with your follow-up. It's the same one that you've seen in previous months, but we're going to send it out in a follow-up again for you, and this will also be up on the ECLKC when that is ready. And so here is one activity we wanted to focus on.

Kristin: Right, so thinking about -- this is just an example of how you can fill it out. Again, Dawn and I want you to just fill it out for whatever's appropriate for your class. So "How Things Move" could be the activity. The learning objectives could be just comparing how things move, right? How do things move in the classroom? Or how do things -- how do objects move? And then the developmental framework area, science and knowledge and approaches to learning.

Dawn: Yeah, absolutely. And then there -- what might be some of the instructional moves you might use in this situation? So if your learning objective is to get children to compare maybe how two different objects move, maybe through water or maybe without water, you might ask them different questions to facilitate that if you're talking about comparing. If you wanted to do the assessment piece of it, you could have children make drawings of how the different objects moved, and that could be what you look at when you're assessing what do their different drawings look like and looking through their work samples to do that. And, gosh, with this, if you're going to talk about how things move, you're practically covering every STEAM area.

Kristin: That's right, that's right. Engineering, science, math, art, so much can go into these activities that you can cover. And then really kind of the scientific areas and skills development is really understanding the forces of motion. So this is just an example. Feel free to use it, feel free to add to it. We're going to send this out to you for follow-up.

Dawn: All right, so real quickly, we are going to run into resources before we get to introduce Gail and have her come up here with us. The first one is STEM Sprouts Teaching Guide.

Kristin: That's right, this is a really great teaching guide, and you can go to the Boston Children's Museum and you can download this STEM Sprouts Teaching Guide. It has really great, very easy, fun activities to do in each of these areas. And it's downloadable, you can use it. It's very, very teacher-friendly.

Dawn: The next one is the National Girls Collaborative Project -- going back to some of those staggering facts we were talking about. This project is sponsored by the National Science Foundation, and it's trying to promote girls getting more interested in STEM fields. So there's a lot of different resources on there and ways that you can connect with that in your community.

Kristin: Right, and so Code.org is another resource that we showed you. We want you to go to this. It's amazing. Just give it a try. Of course, you don't have to do it in your classroom, but it's just -- what a great way to introduce children if you'd like to. It's a not-for-profit organization, and they really -- their goal is to really get computer science and coding taught in classrooms all across the country. So it's a really great resource.

Dawn: Yeah, as a matter of fact, there's one course that is appropriate for 4-year-olds, and it is, just like we showed you when you were moving the commands over, like the move forward and the turn right and turn left, it's teaching the 4-year-olds how to move those blocks back and forth in that environment by completing puzzles. So, appropriate, maybe something you can send home to do with families.

Kristin: Perfect.

Dawn: And then we also wanted to mention one of our 15-minute in-service suites. This one is Scaffolding Children's Learning. You are doing this every time you're doing something with engineering. And there's a Tips for Teachers in there with some specific strategies and questions you could ask to help scaffold some of that. So you could take a look at that five-minute overview video and do the Tips for Teachers and have a quick little 15-minute in-service suite to work on this instructional move of scaffolding, and specifically to some of the engineering activities you might be doing in the classroom.

Kristin: That's right.

Dawn: Okay, so we are going to take a short break with a poll. We want to know how many are watching with you in Teacher Time land if there's any Teacher Time watch parties going on. And when we come back, Gail Joseph will be with us for the Behavior Management Moment and Resiliency & Wellness. So enjoy the music during the poll. [music plays]

Kristin: Hi, everyone. We are back now with Gail Joseph. Hi, Gail!

Gail Joseph: Hello! Great topic today.

Kristin: We're excited! Behavior management seems to go perfectly with this.

Gail: With block corner, is that what you're thinking? That's what I'm thinking as well. In fact, I'm just thinking about times when -- you know, I wasn't as sophisticated as the ideas that you've been giving

today. I just think these are great ideas. But I do remember times when I was a Head Start teacher and I would try and introduce some new building materials or blocks in the block corner, and, you know, one type of block that I really loved -- someone gave these to me as a gift, and I loved these for older kids because they're cool blocks that have this kind of tunnel through them, and so you can create some intricate kind of marble mazes and things with them. You can engineer -- you can give them different problems to solve with these.

But one of the things that would often happen is that I would introduce at group time, at large group time, circle time, is I would say, "We've got these great new blocks over in the block corner today!" You know, do my good infomercial. "And maybe you want to see if you can build something as tall as you can make it," or, "See if you can make a marble maze where you can't even see the marble, it's enclosed." So you give them a little challenge, introduce some new materials, and let them go, right? Okay, well, oftentimes the only thing I was engineering was a little bit of chaos over there, okay? So I wanted to talk about maybe some Behavior Management Minute tips as people are getting really excited about doing all these great things that you're talking about.

So one thing for our Behavior Management Minute is to think about when you're giving activity instructions, so when you're saying something, those challenges, right, "We've got blocks and see if you can build it as high as you can or as tall as you can," is whenever you're giving activity instructions -- and this goes probably with everything, not just in the block area -- is to also give the social instructions. So, "How are you going to do that activity in a group with friends, all right? So you're going to build the tower as tall as you can, but you're also going to take turns with the blocks, and this is what it looks like," right? So you're going to pair it with a social instruction. "What if two people want the same block, what are we going to do? We're going to get our solution kit out and solve that problem, okay?" So thinking about whenever you're giving activity instructions, to also pair it with the social instructions for how we're going to do that in a group.

Okay, another one. This is super practical. But one of the things that always happened in my classroom is that children would go straight to the block shelf for the new and exciting building materials, and they'd start -- you know, they'd pull it just right off the shelf and they'd build it right there. Yeah, you've had that happen, too. And so what happens? High-traffic area, children are bumping, trying to grab the other blocks. All of that creates some challenging behavior, right? So here's a simple little thing is to tape off a space in front of that block shelf. Probably a lot of our viewers are doing this already. Taping off a spot in front of that block shelf and say, "No-build zone," right? So this is the space where you can grab your materials, but you need to build outside. It's the no-build zone. So you can just do that with tape. I have a picture of someone that's done that before.

And then one other little tip is that when you're having children build and they're building next to each other, sometimes they might want to grab somebody else's block. And you can maybe just highlight some visual reference for them of what is their space and what are their materials and what is somebody else's materials. And so you can do that by having children build in trays, maybe some even lower trays, like the food trays. And if you have materials that are going to spill out all over the place and perhaps you're going to have a wayward marble and somebody's going to want to go chase it, and there goes that structure someone has been working on for so long, is that you could also make sure that you build in like just in cardboard lids, right? It keeps all of the materials together so those marbles don't stray too far.

So those are just a couple things. I have a couple pictures of these in action. So here's those good old problem solving pictures that folks can get on the ECLKC. And they can also get them on the Head Start Center for Inclusion. Some great problem solving pictures that could go in a solution kit right along in that block corner, because you want to be prepared in case there's some trouble sharing or some difficulties there.

Kristin: In the block area!

Gail: Put them right there in the block area so you're ready, so your engineering, all of that great work doesn't get interrupted by someone that's having a difficult time problem solving.

This is another picture. This is an older picture, and I just wanted to highlight there's that tape that's running along. You see the orange, the finger pointing to that. that's the no-build zone, and the children know that, so they're building outside of that. And then I love this idea, too. So oftentimes children will get a project started, and then they have to get called away. Maybe they have to use the restroom, maybe they got called over to talk with a teacher or they're doing something, and they don't want somebody to mess with that project. They're going to come back to it, right? So they're still building. So I love this, is that you could have some signs that children could just grab -- they're right there in the block corner. They could grab, throw it on their structure that says, "Hey, I'm still working on this," right? So maybe it's a construction area or it's "I'm still building." I've seen some teachers even bring in some writing materials, and children can make their own signs, right? They can put their name on it on there, and that means to save it, I'm going to come back to it later. So those are just a few behavior management tips that might go along with some of the engineering and block building things.

Kristin: That's exactly what we need, right? We want teachers to be so successful when you try these projects. Here you go, add these to it.

Gail: That's right, that's right.

Kristin: We are just going to be back with you in just a moment. We're going to take just a very short break before going on to Resiliency & Wellness. We'll see you in a moment.

[music plays]

Dawn: All right, we are back with Resiliency & Wellness. I love this part.

[Kristin sighs]

Dawn: Take care of me, Gail!

Gail: All right, you want to know what I brought today?

Dawn: Yes, I do.

Gail: I like to bring things to you.

Kristin: She always brings us something.

Gail: I do. This one might be a little weird, though. So I brought to you...okay, bull's-eye.

Dawn: Target practice?

Gail: Right. Bull's-eyes. Bull's-eyes, okay. I love this. So I've said this before in our -- and I'm going to tell you what these are, too. I've said this before on this little segment here, is that we can experience a lot of stress in our lives when we're engaging in daily behaviors or the things that we're doing on a regular basis are kind of out of alignment or off target with our core values. So when you think about what you really value, what you aspire to do and to be and live like every day, when you're off on that, creates a lot of tension. So maybe it's something about -- that you really want to be an interested and involved parent. That that is a core value, but you're finding that, "Wow, I haven't gone on a field trip with my child in a while," or something like that, and that feels stressful, right? It feels stressful when you're out of alignment. And so this is this great activity that can help you start thinking about clarifying your values and also just evaluating a little bit or assessing a little bit about how close you are to actually living in accordance with those values. How close are you to the bull's-eye, right?

So let me show you what this looks like. We think about this -- and let me just give credit here. This was adapted from Tobias Lundgren, and I learned about this activity from my colleague Clay Cook. And so I'm very grateful, because I like to use this a lot. So here's our bull's-eye, and you can see a bull's-eye up on the screen as well. And so we want to think about kind of four quadrants or four domains in which we want to think about the values that we have in our lives. So one segment maybe up here is work and education. I'm going to use your Post-It notes here. So is the work and education, right, so you want to think about what's your core value in work and education? So maybe your core value in work is that you want to be a warm and responsive and engaging instructor, a Head Start teacher, right? And you are, so you're right there. You are like right in accordance, okay? Let's say that -- because we also want to think about education. Let's say that you really value education, you really aspire to continue to grow in education, to maybe get a degree that you don't yet have, right? You really hold that as a core value, but you are not currently enrolled in a course, you're not currently enrolled in an informal kind of learning experience, so maybe you're feeling like on a daily basis you're a little bit off target here, right? You really want to go back and get that degree, maybe you've really wanted to get that graduate degree, but you're a little bit out here. So you want to think about that. You're going to assess kind of where you're -- you're going to clarify your values -- and your values, not what you think other people's values should be, but your own. What do you really value? And how close are you to that?

So let's think about the other quadrants. So the other quadrant is leisure and recreation, those things that you enjoy doing, those things that just help you unwind, that really give you joy to your day.

Kristin: Hobbies.

Gail: So hobbies, exactly. So maybe if -- thinking of hobbies, maybe you're a very creative person, maybe you love to paint. Maybe you love to do woodworking, you do something creative. And being creative is something that you really value, right? But let's say you have not picked up that paint brush in -- you know, it seems like six months, and so you're really feeling kind of the stress out here. Maybe you love gardening and you have a beautiful garden that you're growing, and you're right in accordance. So you want to think about kind of where you are.

Let's think of the other quadrant. The other one is relationships. Such a huge one. We talk about that a lot on Teacher Time during Resiliency. So relationships. Thinking about your family, thinking about friends, thinking about colleagues. So maybe you really value, again, being that involved and interested parent, and you're doing a great job of that, so you're feeling like you're right there in accordance. Maybe you are having some -- maybe you are also in -- thinking about your collegial relationships, and you really like to be collaborative with your colleagues. You like to plan together. That's something that you really value that maybe you haven't had time to do that for a while, and so you haven't done any planning with them and you're kind of out here. So you're going to think about what are your values and where are you at today?

Then the last one is your personal growth and health. So thinking about taking care of yourself. We've talked about that before: eating healthy, exercising, drinking enough water, getting enough sleep. But this is also your spiritual health, this is your emotional health. So maybe something that you value is spending a little bit of time each day being really mindful. Maybe it's a meditation that you really value. You value that a lot, but it's been a while since you've done that, so you're out here, okay? So then you want to think about --

Kristin: Missing your target.

Gail: Exactly. So I'm going to give you four little steps here. So the first thing is -- or three steps here. So you're going to clarify your values in four aspects of your life. So I just kind of went through that. You're going to think about your bull's-eye here and you're going to think about these four quadrants. What is your value in work and education, personal growth and health, relationships and your family, leisure time -- hobbies, those things. Then you're going to assess how on target are you, your daily actions. So really think about that. So if I'm really valuing this, am I -- is my daily action kind of in accordance or not? How close am I to the bull's-eye? If you're off target, no big deal. No worry. You're just helping to kind of like understand a point of stress that you might be experiencing in your life, right? It helps you kind of understand like, ooh, that's where that's coming from. And you can do a simple daily action or you could do a big action. I love that idea.

So you could think about -- let's go back up to work and education. Remember, you value that education, you wanted to go back and get that degree, you've been wanting to do that for a while, but you haven't. You're not currently enrolled or anything. So maybe a small action is that, hey, today I'm going to look and see what courses they're offering, right? And I'm going to do a little small step here, right? Or maybe I'm going to say, "I'm doing it. I'm going to go take that GRE," or, "I'm going to meet with an academic advisor." Vroom, right! Getting a lot closer. So you can think about these small actions, big actions, but the idea here is that I'm just kind of in touch and aware of what my core values are and how close I am to those -- or far away -- and making little daily actions or big actions that get me closer. That's it. Your bull's-eye.

Dawn: To move to your target.

Kristin: I love that. I love that, Gail! What a great activity for teachers to do in groups, in staff meetings, but really also a personal activity, right? They're all going to be different.

Gail: That's right.

Kristin: I love it. Thank you!

Gail: Of course.

Kristin: Thank you very much. Okay, so we're going to take just a very short break and just be back with some very quick closing announcements. Don't go away yet, because we have the most adorable moment of aww at the end of the show today. We'll see you in just a moment.

[music plays]

Kristin: All right, welcome back, everyone. We know we have gone over just a tiny bit, but we are just going to give you some very quick announcements. We want to hear from you. We really want you to fill out the evaluation and, again, email us at any time. Any time you have questions, you can email us: ncqtl@uw.edu.

Dawn: All right. And so if you've signed in, you've joined our community, you can get our announcements there. You can also look for Teacher Time follow-up resources on the Office of Head Start Facebook page. They're going to be posting a follow-up video of stuff that we went over here today, and we'll be there to chat with you and answer some questions there and just be in conversation with you on the Office of Head Start Facebook page. And then if you haven't signed in to receive follow-up documents from us, please go ahead and do that and take the time to sign in now.

Kristin: That's right, so the evaluation and certificate, that's going to be open for the next hour -- sorry, the evaluation, which is how you get your certificate. And just a reminder that certificates are only available during this live show. They're not available for watching an archived show. So today is your day, right? So you can expect the certificate probably later next week.

Dawn: That's right. All right, so we will be back March 13th for another great Teacher Time show. We're going to be focusing on using storybooks and also picturing America. Very excited about that.

Kristin: We are very excited about that. All right, you can always find recordings on TeacherTime.org and on the ECLKC.

Dawn: Bye. Enjoy your moment of aww.

Kristin: See you next time.

Teacher: Are you going to go through, Adrian, or are you going to sit on my lap? I don't want you to sit on my lap. You need to move! Go on! You need to move. They're not going to let us go through. Yeah! It's not happening.

[music plays]